

REMARKS

Claims 1-41 remain pending in this application. Claims 1, 8, 15, 22, 30, 33, 36, and 39 are independent. Claims 1, 8, 15, 22, 29-30, 32-33, 35-36, and 38-39 have been amended, and no claims have been added or canceled by this amendment. No new matter is involved with any claim amendment.

Anticipation Rejection By Allan et al.

Withdrawal of the rejection of claims 1-29, 31-32, 34-35, 37-38, and 40-41 under 35 U.S.C. §102(b/e) as being anticipated by Allan et al. (US 2002/0021878 A1) is requested.

Applicant notes that anticipation requires the disclosure, in a prior art reference, of each and every limitation as set forth in the claims.¹ There must be no difference between the claimed invention and reference disclosure for an anticipation rejection under 35 U.S.C. §102.² To properly anticipate a claim, the reference must teach every element of the claim.³ “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference”.⁴ “The identical invention must be shown in as complete detail as is contained in the ...claim.”⁵ In determining anticipation, no claim limitation may be ignored.⁶

Discussion of Allen et al.

Allen specifically discloses (e.g., see the Abstract) that “the propagation of the optical signal in the defect waveguide is controlled by varying the optical properties at least one of the upper clad region and lower clad region”. These regions are referred to as “the controllable regions”. Allen et al. changes the evanescent tail of the optical modes extending in the lower and

¹ *Titanium Metals Corp. v. Banner*, 227 USPQ 773 (Fed. Cir. 1985).

² *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 18 USPQ2d 1001 (Fed. Cir. 1991).

³ See MPEP § 2131.

⁴ *Verdegaal Bros. v. Union Oil Co. of Calif.*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

⁵ *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

⁶ *Pac-Tex, Inc. v. Amerace Corp.*, 14 USPQ2d 187 (Fed. Cir. 1990).

or upper clad regions. In contrast, Applicants change the optical properties in the plane of the actual defect waveguide region itself by an electro-optic effect, for example, and not by an effect in planes of the upper and lower clad regions, i.e., in planes different from the plane containing the waveguides.

Specific Deficiencies of the Applied Art

Allen et al. do not disclose an electro-optical switch that includes, among other features, "...first and second waveguides each arranged in a plane therein and each having a respective input portion and a respective output portion, wherein the first waveguide is adjacent to the second waveguide along a coupling length in the plane, and a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides", as recited in independent claim 1, as amended.

Further, the applied art does not disclose a photonic bandgap integrated circuit that includes, among other features, "...an electro-optical switch formed by providing first and second waveguides in said photonic crystal adjacent each other in a plane containing a coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides, wherein the first and second waveguides each have a respective input portion and a respective output portion", as recited in independent claim 8, as amended.

In addition, the applied art does not disclose a coupled photonic crystal waveguided system that includes, among other features, "first and second photonic bandgap waveguides provided adjacent to each other in a plane containing a non-piezoelectric coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides, wherein the first and second waveguides each have a

respective input portion and a respective output portion”, as recited in independent claim 15, as amended.

Finally, the applied art does not disclose a method for providing an electro-optical switch that includes, among other features, “...providing first and second waveguides in the photonic crystal adjacent to each other in a plane along a coupling length; and changing a conductance in the plane along the coupling length to provide electro-optical switching between the first and second waveguides, wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length, wherein the first and second waveguides each have a respective input portion and a respective output portion”, as recited in independent claim 22, as amended.

Accordingly, since the applied art does not disclose all the claimed features, reconsideration and allowance of claims 1-29, 31-32, 34-35, 37-38, and 40-41 are respectfully requested.

Anticipation Rejection By Flory et al.

Withdrawal of the rejection of independent claims 1, 8, 15, and 22 under 35 U.S.C. §102(c) as being anticipated by Flory et al. (US 6,775,430 B2) is requested.

The legal requirements for anticipation have been set forth above.

Discussion of Flory et al.

Flory specifically discloses a photonic crystal interferometric switch having a photonic crystal; a waveguide in the photonic crystal, the waveguide having at least one input portion, at least two output portions and an interference channel connecting the at least two output portions, the waveguide capable of transmitting light within a bandgap of said photonic crystal; and a resonant member connected to at least one of the at least two output portions to control a property of light in the at least one output portion, to control the interference of light in the waveguide. A 1x2 optical

switch may be constructed by tuning the parameters of the resonant member either optically or electronically, resulting in a switching of a light signal from one output portion to another output portion. Furthermore, by isolating one output portion of the interferometer, the apparatus may be utilized as an optical modulator.

Flory et al. uses interference channel 35 to effect the coupling between outputs 33 and 34. Further, Flory et al. discloses a single input 32, with channels 32, 33, 34, and 35 all physically interconnected. In contrast, Applicants waveguides are physically isolated from each other, and induce coupling through an electro-optic effect along the coupling length.

Specific Deficiencies of the Applied Art

Flory et al. do not disclose an electro-optical switch that includes, among other features, "...first and second waveguides each arranged in a plane therein and each having a respective input portion and a respective output portion, the respective input portions being unconnected to each other, wherein the first waveguide is adjacent to the second waveguide along a coupling length in the plane, and a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides", as recited in independent claim 1, as amended.

Further, the applied art does not disclose a photonic bandgap integrated circuit that includes, among other features, "an electro-optical switch formed by providing first and second waveguides in said photonic crystal adjacent each other in a plane containing a coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between the first and second waveguides, wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other", as recited in independent claim 8, as amended.

In addition, the applied art does not disclose a coupled photonic crystal waveguided system that includes, among other features, "first and second photonic bandgap waveguides

provided adjacent to each other in a plane containing a non-piezoelectric coupling length, wherein a change in conductance in the plane along the coupling length resulting from an electro-optic effect in the coupling length provides electro-optical switching between said first and second photonic bandgap waveguides, wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other”, as recited in independent claim 15, as amended.

Finally, the applied art does not disclose a method for providing an electro-optical switch that includes, among other features, “...providing first and second waveguides in the photonic crystal adjacent to each other in a plane along a coupling length; and changing a conductance in the plane along the coupling length to provide electro-optical switching between the first and second waveguides, wherein said changing a conductance is accomplished by an electro-optic effect within the coupling length, wherein the first and second waveguides each have a respective input portion and a respective output portion, the respective input portions being unconnected to each other”, as recited in independent claim 22, as amended.

Accordingly, since the applied art does not disclose all the limitations in the claims as amended, reconsideration and allowance of independent claims 1, 8, 15, and 22 are respectfully requested.

Unpatentability Rejection over Allan et al. and Augusto

Withdrawal of the rejection of claims 30, 33, 36, and 39 under 35 U.S.C. §103(a) as being unpatentable over Allen et al. in view of Augusto (US 2002/0101895 A1) is requested.

At the outset, Applicant notes that, to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference must teach or suggest all the claim

limitations.⁷ Further, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure.⁸

As admitted by the Examiner, Allen et al. fail to explicitly teach that the change in conductance is induced by electrical carrier injection or optically induced by electron-hole pair generation. To make up for this deficiency, the Examiner relies upon Augusto as teaching this feature, and asserts that Applicants' claimed invention is obvious in light of this combination.

Discussion of Augusto

Augusto discloses wavelength selective active layers arranged in a vertical stack so that photons of differently energies are selectively absorbed in or emitted by the active layers. Augusto discloses changing photon emission and/or absorption characteristics, and not changing photon propagation effects within a waveguide by use of electron-hole pair generation.

Accordingly, since Augusto does not make up for the previously identified deficiencies of Allen et al. discussed above with respect to independent claims 1, 8, 15, and 22, withdrawal of the rejection and allowance of claims 30, 33, 36, and 39 are respectfully requested. These claims have been drafted in independent form as a consequence of the independent claims 1, 8, 15, and 22.

Conclusion

In view of the above amendment and remarks, Applicants believe that each of pending claims 1-41 in this application is in immediate condition for allowance. An early indication of the same would be appreciated.

⁷ See MPEP §2143.

⁸ *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991) and See MPEP §2143.

In the event the Examiner believes an interview might serve to advance the prosecution of this application in any way, the undersigned attorney is available at the telephone number indicated below.

For any fees that are due, including fees for extensions of time, please charge our Deposit Account No. 22-0185, under Order No. 00131-00288-US2 from which the undersigned is authorized to draw.

Dated: May 3, 2007

Respectfully submitted,

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